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Official property

(54) Hollow needle set with system

DE 31 48 306 A1

DE 31 48 306 A1

Patent claims

1. Hollow needle set *characterized in that* the set consists of a hollow needle (Fig. 2), a needle with tongue (Fig. 3), a vacuum rotor (Fig. 4), a mandrin (Fig. 1) and handpiece (Fig. 1/H) in which the hollow needle + needle with tongue + handpiece make up a unit (Fig. 7) and in which the hollow needle + vacuum rotor make up a unit (Fig. 6) and in which the hollow needle + mandrin + handpiece make up a unit (Fig. 5) and in which the hollow needle makes up a unit (Fig. 1).
2. Hollow needle set in accordance with Claim 1, *characterized in that* the hollow needle consists of a one-piece cutting tube and a guide tube, in which the cutting tube is modified to a depth of 1 to 30 mm or greater so that the inner diameter of this part of the cutting tube is greater than the inner diameter of the remainder of the cutting tube.
3. Hollow needle set in accordance with Claims 1 and 2, *characterized in that* the hollow needle consists of a cutting tube that is mounted in a holder and a guide tube that is mounted eccentrically to the cutting tube in the holder.
4. Hollow needle set in accordance with Claim 1, *characterized in that* the tongue needle consists of a rod on which or into which a rotatable tongue is provided, in which the tongue forms an angle to the rod of between 1° and 15° in its folded position and an angle between 75° and 110°, but preferably 90° to the rod in its extended position, and that this angle is securely adjustable between 75 and 110° by means of a fixed blocking provision.

5. Hollow needle set in accordance with Claim 1, *characterized in that* the tongue needle, in a different embodiment, consists of a rod and a shaft, where the shaft preferably has a round cross-section and where the cross-section of the rod is preferably rectangular and where the cross-section of the rod is smaller than the cross-section of the shaft and where the rod and the shaft are connected together and where the shaft is preferably aligned with the external corner of the rod, that is, rod and shaft form a continuous line at one corner.
6. Hollow needle set in accordance with Claims 1, 4 and 5, *characterized in that* the rotatable tongue of the tongue needle is additionally provided with a spring and that the tongue is thereby pressed into the initial position 1° to 15° relative to the rod.
7. Hollow needle set in accordance with Claims 1, 4, 5 and 6, *characterized in that* one or more tongue needles are attached to a rod, partially movably and partially fixedly.
8. Hollow needle set in accordance with Claims 1, 4, 5, 6 and 7, *characterized in that* the rod and/or the shaft may have a hole of arbitrary cross-section.
9. Hollow needle set in accordance with Claims 1, 4, 5, 6, 7 and 8, *characterized in that* the rod and/or the shaft may have a longitudinal groove of arbitrary cross-section.

10. Hollow needle set in accordance with Claims 1, 4, 5, 6, 7, 8, 9, *characterized in that* in another embodiment the rod consists of a cross-section with three lateral sides.
11. Hollow needle set in accordance with Claims 1, 4, 5, 6, 7, 8, 9, 10, *characterized in that* in another embodiment the shaft consists of a spiral or drill shaft with or without a rotatable tongue.
12. Hollow needle set in accordance with Claims 1, 4, 5, 6, 7, 8, 9, 10, 11, *characterized in that* in another embodiment the shaft may have constrictions of equal or unequal sizes and in any number.
13. Hollow needle set in accordance with Claim 1, *characterized in that* the mandrin may consist of a spiral drill.
14. Hollow needle set in accordance with Claims 1, 2 and 3, *characterized in that* the holder may have one or more holes of arbitrary cross-section perpendicular to its longitudinal axis.
15. Hollow needle set in accordance with Claim 1, *characterized in that* the vacuum rotor is provided with a rotatable chuck and this rotatable chuck extends into a vacuum chamber in the form of a hollow shaft.
16. Hollow needle set in accordance with Claims 1 and 15 *characterized in that* the vacuum rotor is provided with a compressor which is built into the vacuum rotor or is connected to the vacuum rotor by means of a hose and in which the electrical power supply cable is incorporated into the hose.

17. Hollow needle set in accordance with Claims 1, 15 and 16, *characterized in that* a connection exists between tube 1 of a Y or T-connector and the compressor and between tube 2 and the power supply and between tube 3 and the vacuum tube, where tube 1, tube 2 and tube 3 are tubes of the T-connector.
18. Hollow needle set in accordance with Claims 1, 15, 16 and 17, *characterized in that* the drive shaft with chuck of the vacuum rotor rotates at a speed of less than 2 revolutions per second.
19. Hollow needle set in accordance with Claims 1, 2, 3 *characterized in that* in a further embodiment a stripper (Ab) is placed inside the cutter tube (S, Fig. 11).
20. Hollow needle set in accordance with Claims 1, 2, 3, 19, *characterized in that* in a further embodiment a spacer (Di) may be inserted in the holder or at another location, for example, in the cutter tube (S) to press the stripper away from the inner wall of the cutter tube when required.
21. Hollow needle set in accordance with Claims 1, 2, 3, 19, 20, *characterized in that* in a further embodiment the stripper may be attached entirely or at one end to the cutting edge (R) of the cutter tube (S) by means of welding, brazing, pressing or any other type of fastening technology.
22. Hollow needle set in accordance with Claims 1, 2, 3, 19, 20, 21 *characterized in that* the spacer (Di) can be actuated electrically or by means of compressed air.

23. Hollow needle set in accordance with Claims 1, 2, 3, 19, 20, 21, 22 *characterized in that* the spacer (Di) operates directly against the stripper by means of compressed air and thus presses the stripper away from the inner wall of the cutter tube (S).

HOLLOW NEEDLE SET

20 September 1981

In human and veterinary medicine, as well as in engineering and science, it is necessary to remove samples from bodies or solid objects.

It is necessary to remove samples from foodstuffs, plastics, contaminants, and dead bodies, etc. For such procedures hollow needles have been used.

Procedures and equipment in this field are already known. The equipment currently in use, however, cannot be used successfully on all occasions. The invention has as its object an apparatus and tissues, fluids and material can be removed with this apparatus from sites where present-day apparatus does not succeed. The apparatus will be described here in its application and in an enumeration of its individual parts.

The apparatus consists of several parts (Fig. 1) which may be assembled in various ways: a hollow needle (N), which is specially ground and prepared, a mandrin (M) such as is already in use in other sets, a tongue needle (Z), a handpiece (H), the stripper (Ab) and the vacuum rotor (V).

The hollow needle (Fig. 2) consists of the cutter tube (S) with edge (R). This cutting tube is inserted into the holder (G). Another tube—a guide tube (F)—is inserted into the other end of the holder (G). The interior (J) of the upper part of the cutting tube has been modified and its inner diameter has been enlarged. This enlargement may extend 20 mm deep or deeper. The guide tube may be centered (z) within the cutting tube and the cutting tube and the guide tube may have the same diameter.

However, the guide tube may also be mounted eccentrically (ex) in the holder and the guide tube may also have a diameter different from that of the cutting tube.

The tongue needle (Fig. 3) consists of the guide shaft (Y), the rod (T), the tongue (L) and the tip (SP). The guide shaft (Y) is preferably round; however, it may have any desired cross-section. It is advantageous for the guide shaft (Y) to be round and the rod (T) to have a significantly smaller cross-section. It is also advantageous if the rod (T) is mounted eccentrically (ex) with respect to the guide rod (Y).

The vacuum rotor (V) (Fig. 4) is an apparatus that is provided with a chuck (Fu). This chuck holds the holder (G) by the adapter (A). A vacuum pump (Vz) is built into the vacuum rotor (V) or the vacuum is provided by means of a hose (Sch). The power cable (Li) is built into the hose (Sch) to provide the electrical energy for the rotor component.

The rotor component is designed so that no gaskets are required. The rotating shaft (W) is driven by a motor (Mo). Both components extend into the vacuum chamber (Vk). A cover (D) is provided there, in which cover the hose (Sch) terminates. The electrical power (Li) is located in the hose.

The equipment enumerated here is used in combination.

Combination 1 (Fig. 5)

The mandrin (M) is inserted into the hollow needle (N) with holder (G). This combination is pressed into the solid mass. The mandrin is then withdrawn from the mass.

Combination 2 (Fig. 6)

The vacuum rotor (V) with its chuck (Fu) is attached to the holder (G) by adapter (A). The vacuum rotor rotates and at the same time the cutting tube is maintained under constant vacuum. The cutting tube (S) is pressed into the solid mass by pressure on the vacuum rotor. The tissue (Ge) moves into the cutting tube. When the intended point has been reached and sufficient tissue or solid mass has been collected within the cutting tube, the vacuum rotor is switched off.

Combination 3 (Fig. 7)

The tongue needle (Fig. 3) is inserted into the cutting tube (Fig. 2). It is then very advantageous if the guide tube (F) is mounted eccentrically (ex) and if the rod (T) is mounted eccentrically on the shaft (Y) so that the shaft is at the corner of the central (z) shaft and if the rod has the smallest possible cross-section.

If the tongue needle (Fig. 3) is now inserted into the cutting tube (Fig. 2), then the rod (T) must pass through the tissue (Ge) contained within the cutting tube (S). The rod (T) is inserted far enough so that it extends beyond the edge (R). The tongue needle is then withdrawn. The tongue (L) hooks onto the edge (R) and opens outward. Now the tongue needle can be turned and the tongue (L) cuts the tissue off. Solid material is now contained inside the cutting tube, which material is separated from the surrounding mass. If the tongue needle is now turned so that it is 180° from the initial position, the tongue (L) will then extend only slightly beyond the edge (R).

The cutting tube with tongue needle can now be withdrawn from the mass.

Combination 4 (Fig. 8)

The handpiece (H) is screwed off from the tongue needle (Z). The tongue needle is grasped by the tip (Sp) and the hollow needle by the holder (G). The tongue needle is pulled out in the direction shown in the drawing. The mass within the cutting tube falls into the container.

Combination 5 (Fig. 11)

The stripper (Fig. 1) (Ab) is placed inside the cutting tube (S) (Fig. 2). The stripper is a spring that is inserted into the cutting tube (S) as a spring liner. The thickness, width and length of the stripper may be as desired. The stripper works particularly well if the length is chosen so that the stripper rests against the holder and ends at the edge (R). The thickness of the stripper is chosen so that the spring has enough tension so that it lies closely against the inner wall of the cutting tube (S). The width of the stripper should not be greater than the inner circumference of the cutting tube. A width of two-thirds of the inner circumference is particularly advantageous. A spacer (Di) is provided in the holder (G) or at another location. The spacer can press the stripper (Ab) away from the inner wall of the cutting tube (S) (Fig. 11). The spacer may also be in the form of a wedge, a lever or any other element that can press the stripper (Ab) away from the inner wall of the cutting tube (S). The spacer is inserted as required.

1. If the mandrin is inserted as in Combination 1 (Fig. 5), the spacer is not inserted.
2. If the vacuum rotor is attached as in Combination 2 (Fig. 6), the spacer is not inserted.
3. If the tongue needle is inserted into the cutting tube as in Combination 3 (Fig. 7), the spacer is inserted. The tongue needle is brought into a radial position that corresponds to the arrow marker ↑.

If the tongue needle is inserted in this way, it encounters the barrier of the spacer. At the same time, the tongue needle is extended between the inner wall of the cutting tube (S) and the outer wall of the stripper (Ab). The spacer is now moved out of the way. If the spacer is a screw, then the screw is screwed out. The tongue needle is pushed through the cutting tube (S) and the tongue (L) folds out as described in Combination 3.

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* *Karl-Fritz Reich*

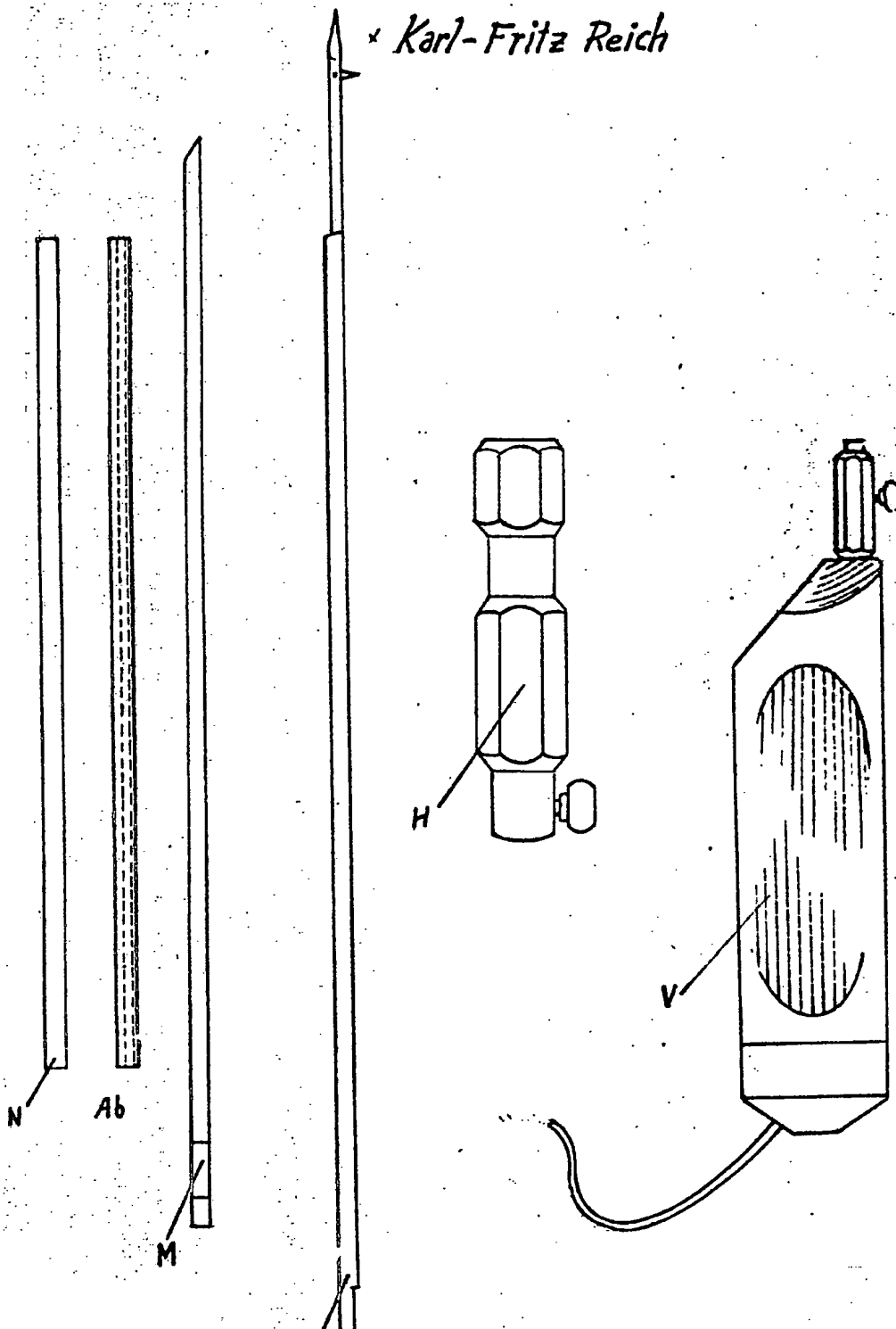


Fig. 1

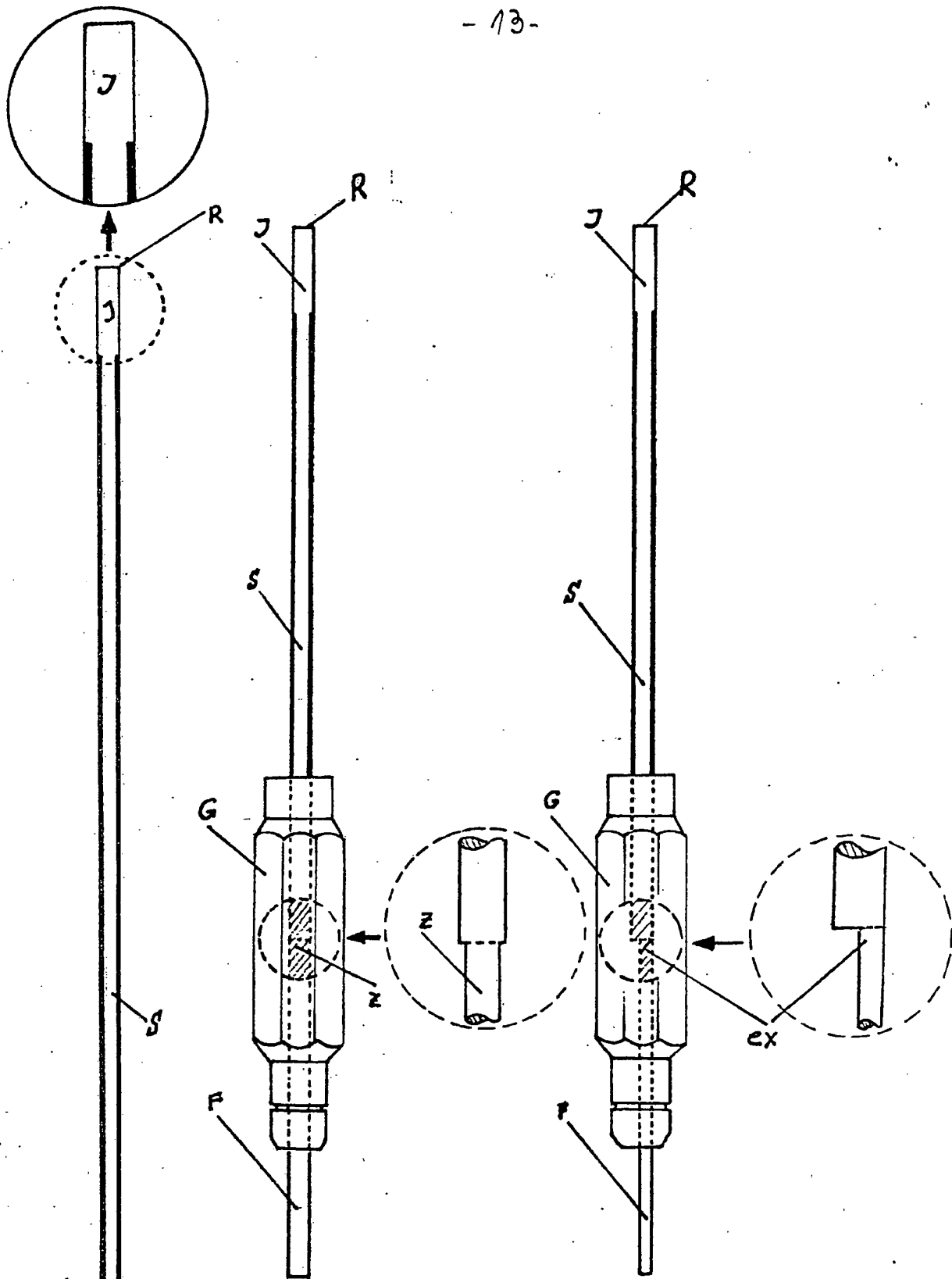


Fig. 2

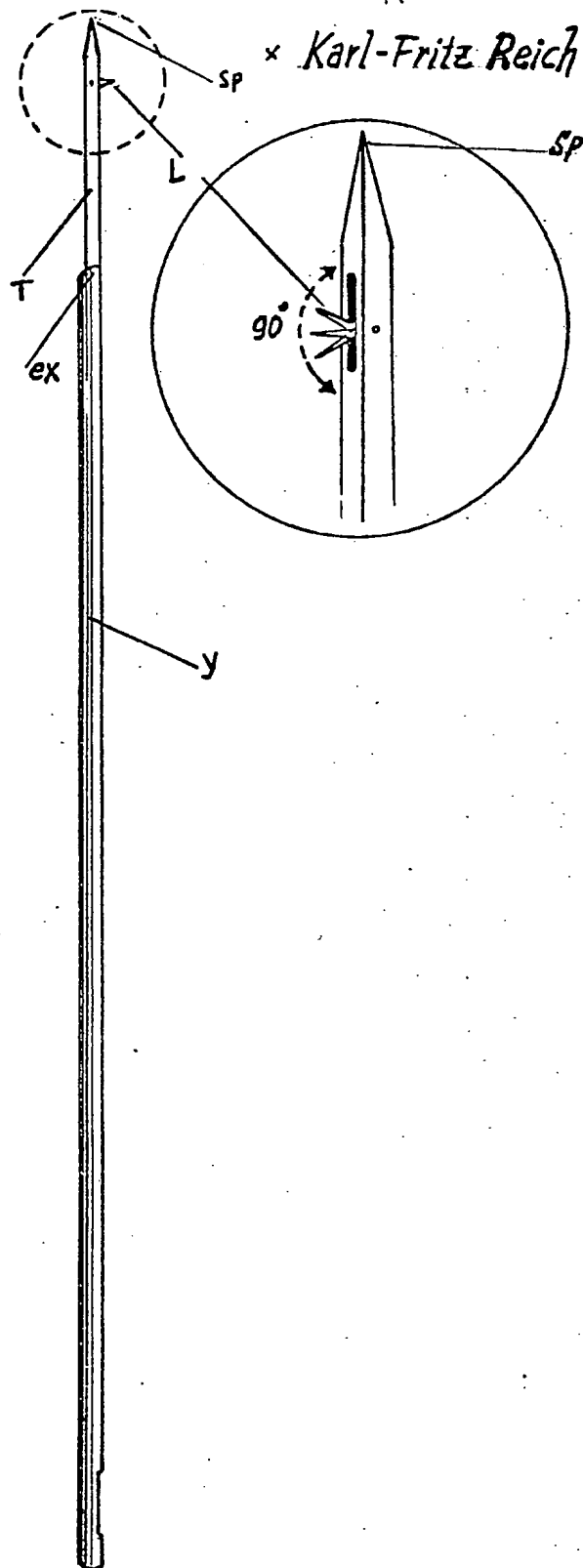


Fig. 3

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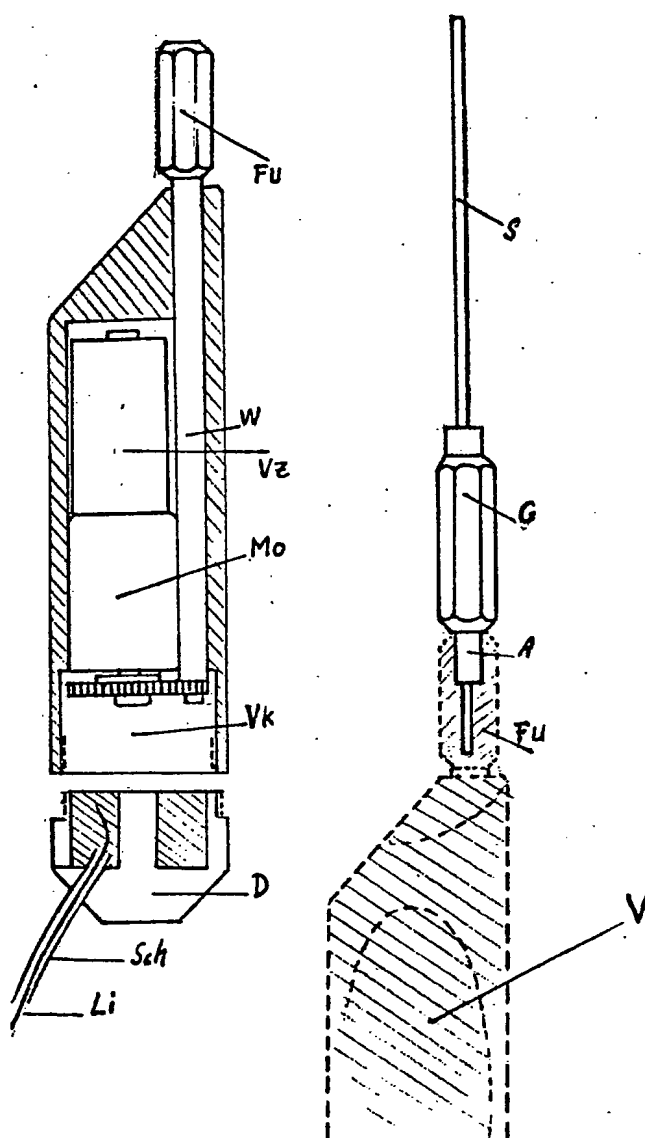


Fig. 4

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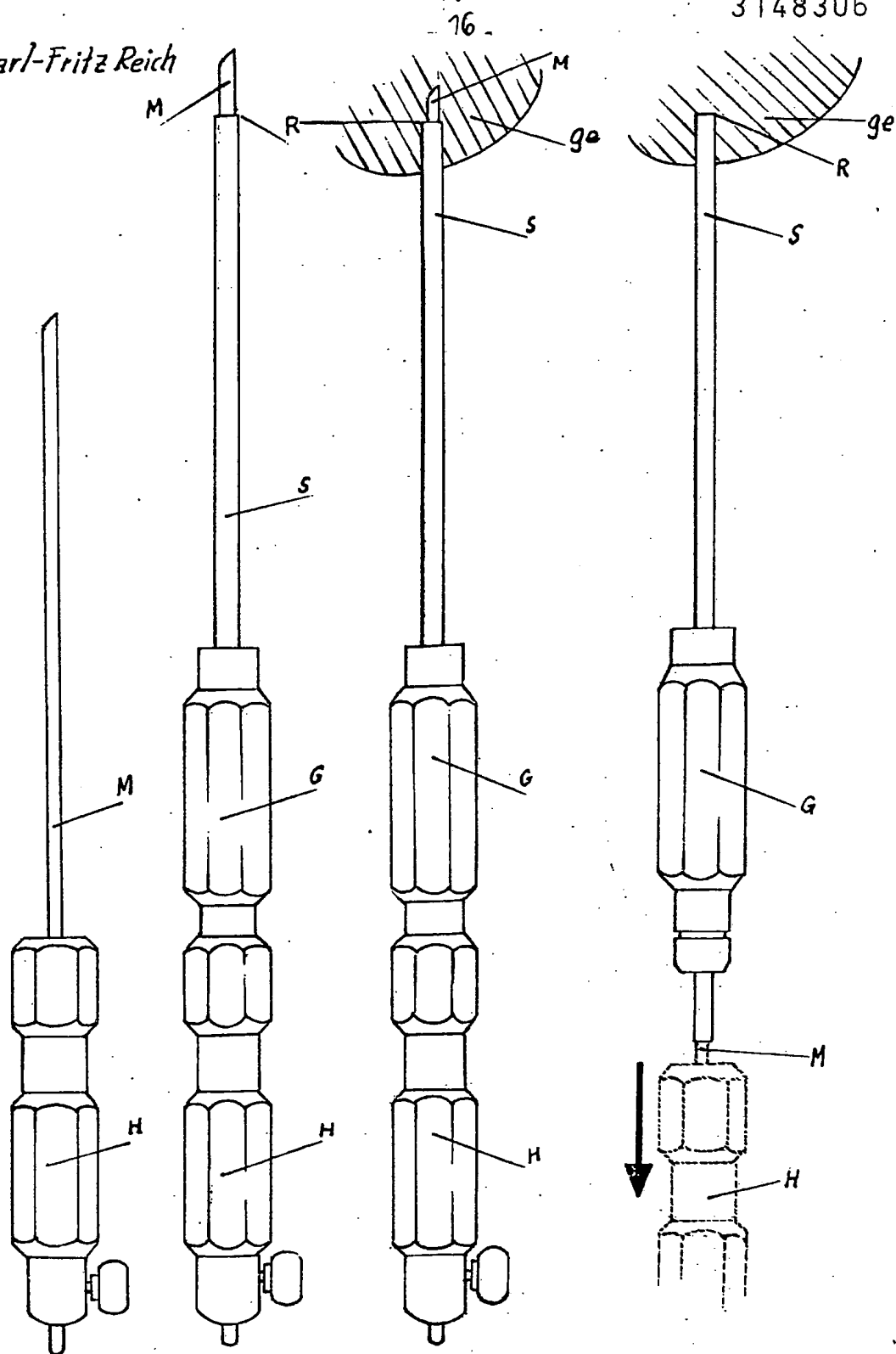


Fig. 5

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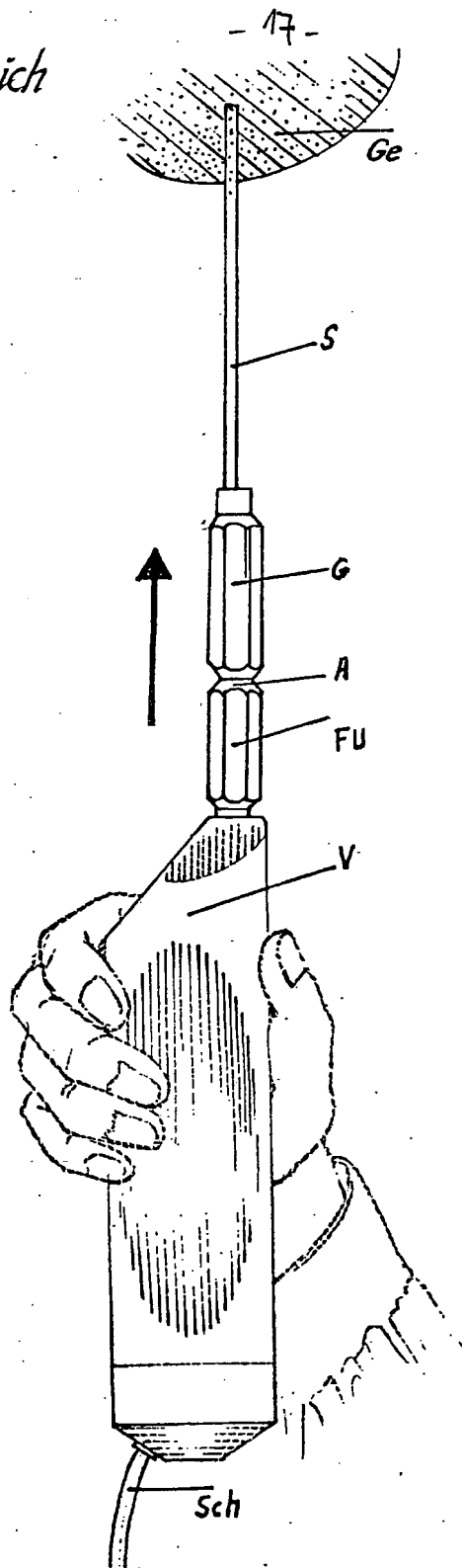


Fig. 6

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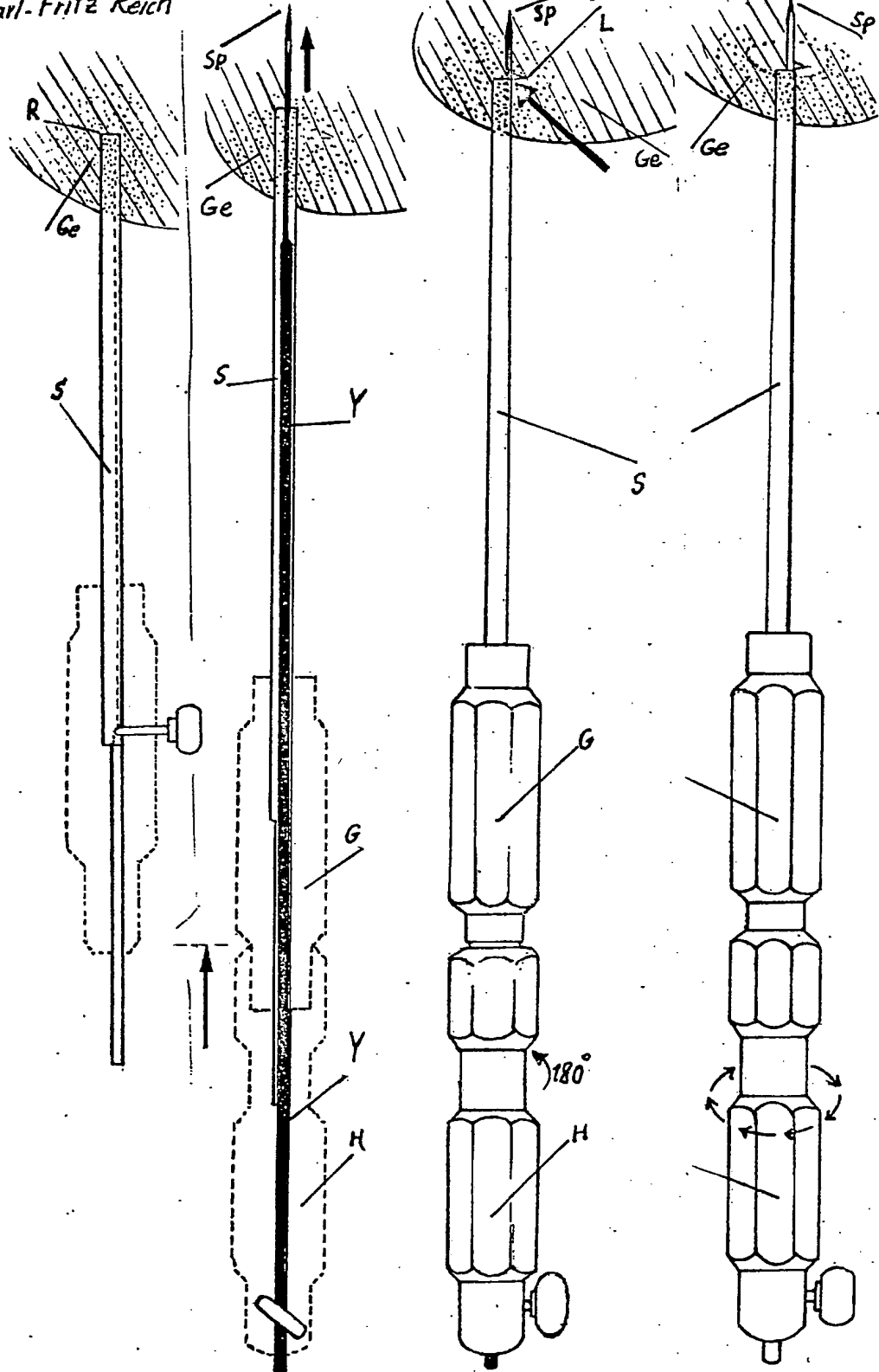


Fig. 7

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- 19 -

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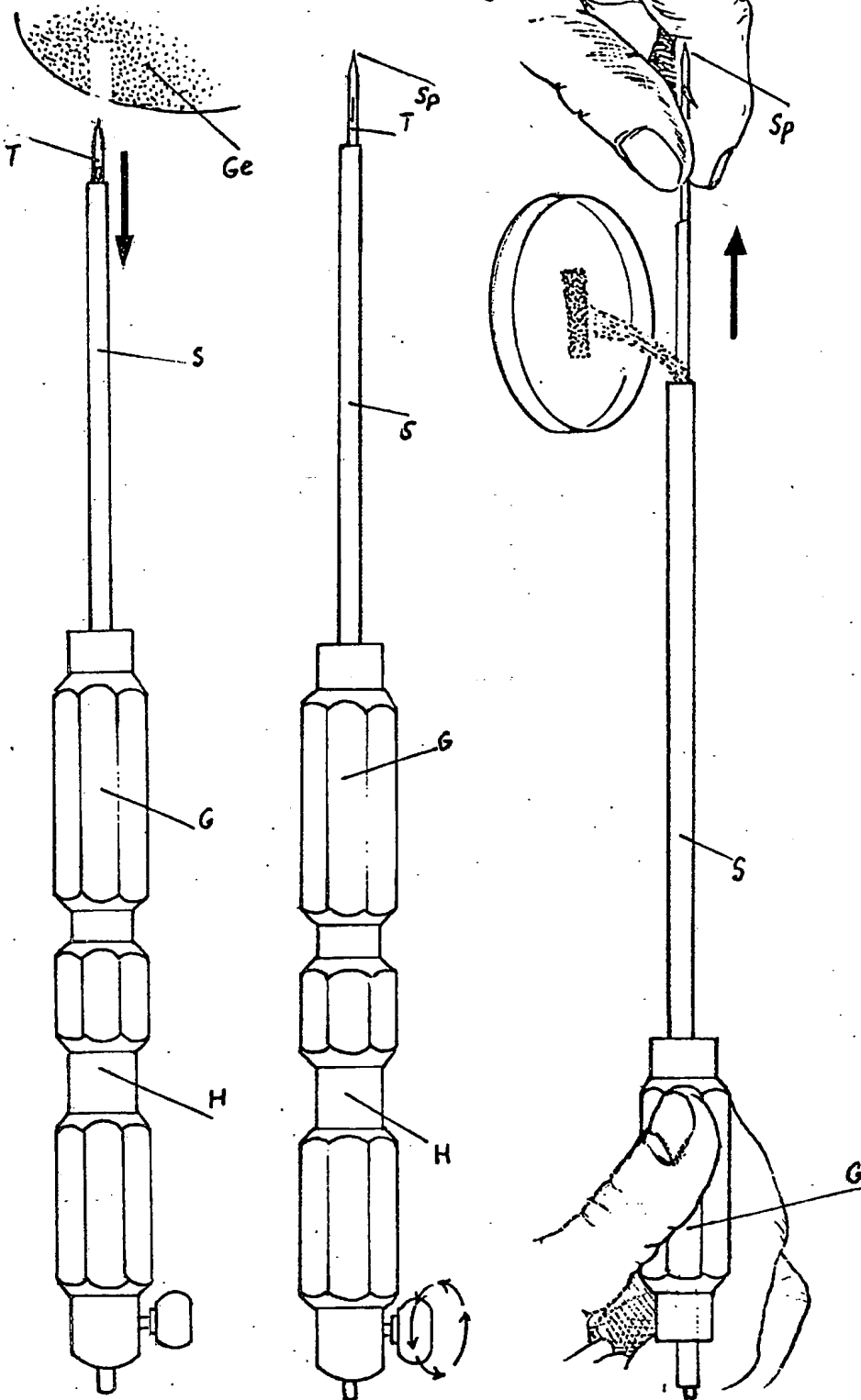


Fig. 8

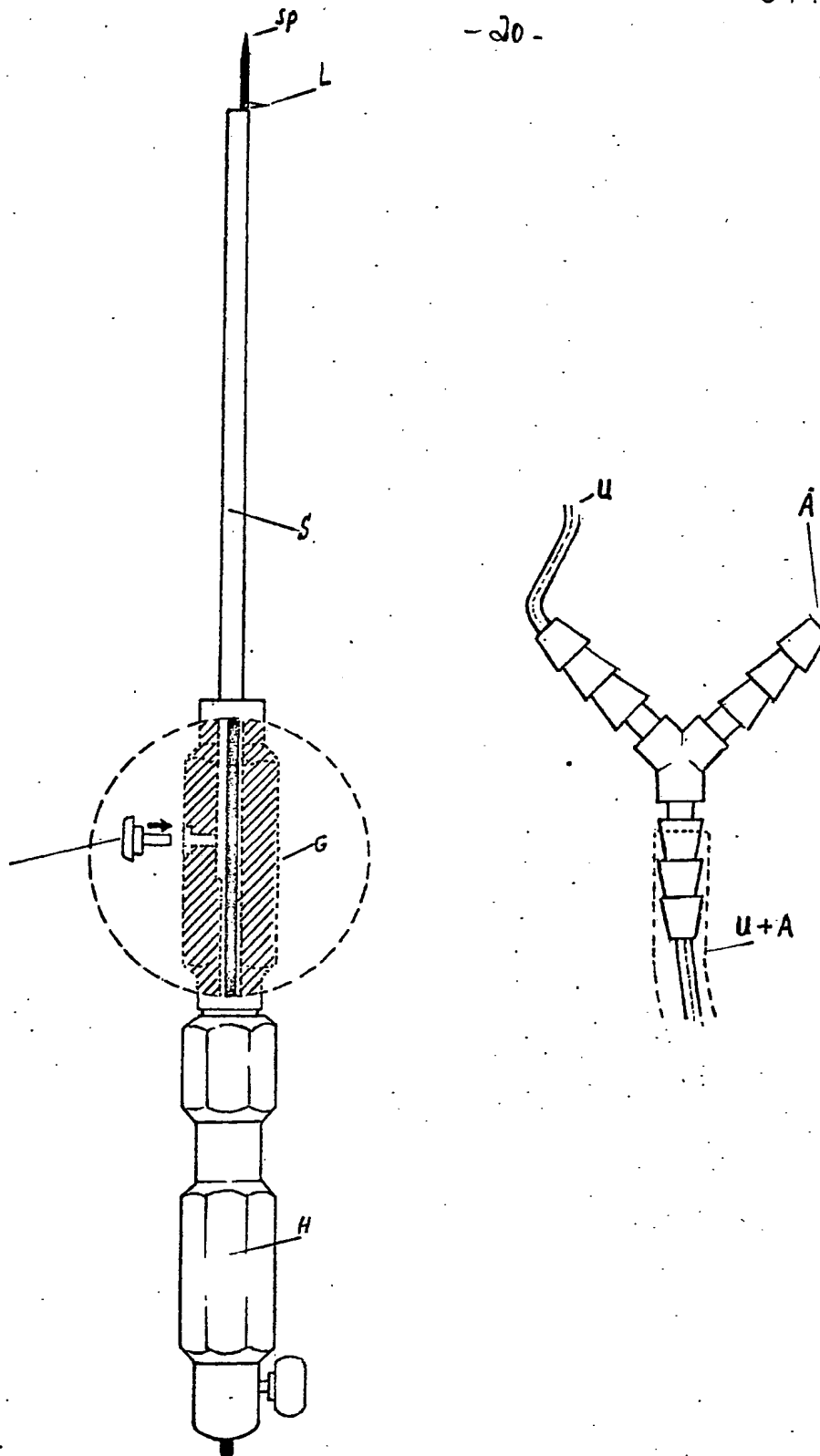


Fig. 9



Fig. 10

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- 22 -

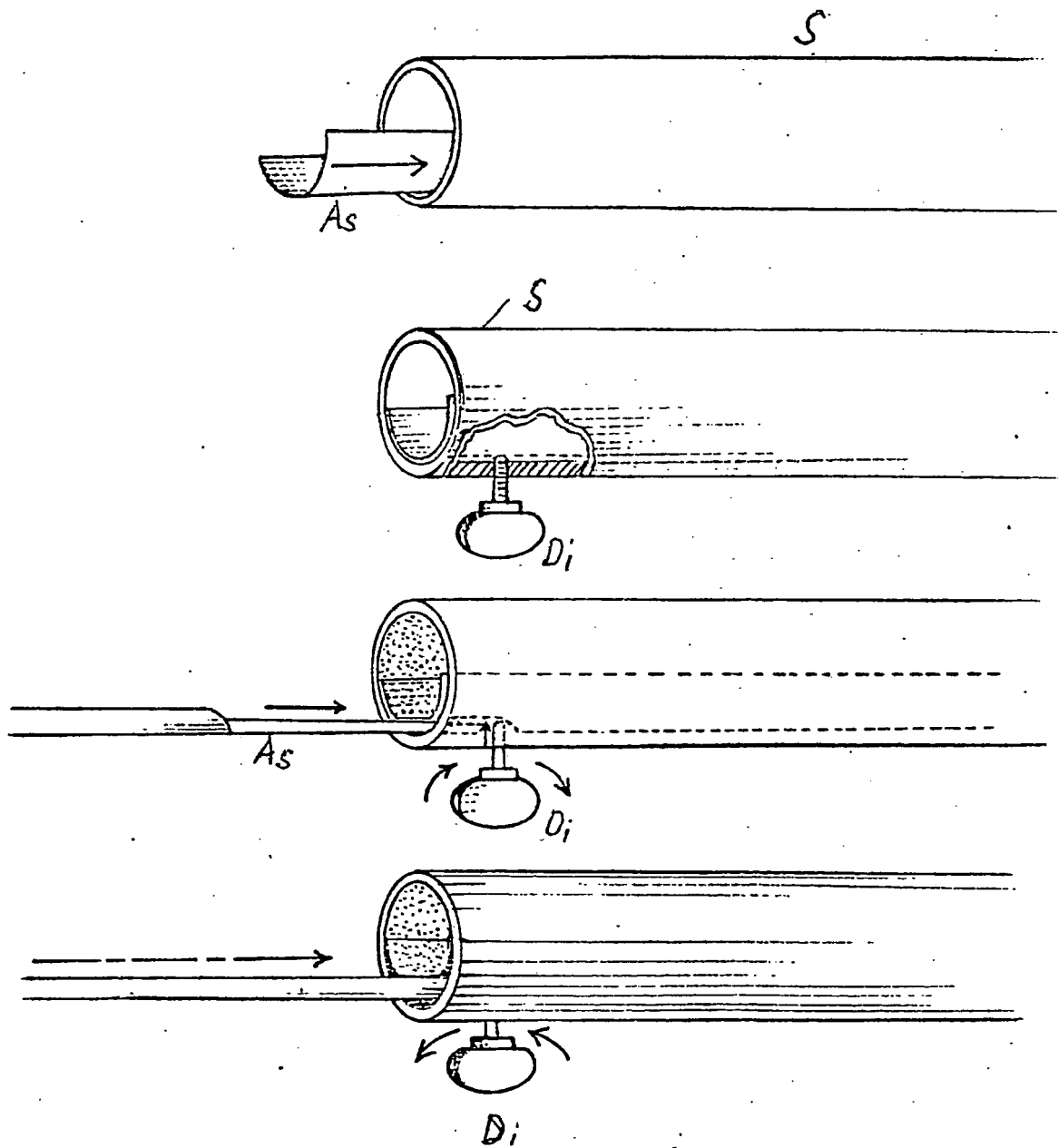


Fig. 11

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